

Aullwood Audubon Energy Plan

Semester of Service – Spring '18

Student Overview

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ETHOS Semester of Service

The University of Dayton ETHOS Center and Fitz Center for Leadership in Community work together to provide students in engineering the opportunity to participate in a Semester of Service. Through the program, students learn and grow through working full-time with Dayton area non-profits. The program also educates students about current social justice topics in the Dayton community.

Aullwood Audubon

In 1957, Marie Aull gave 70 acres of land to the Miami Valley to create the National Audubon Society's first nature center in the Midwest. Five years later, in 1962, Mrs. Aull bought the adjacent farm to protect the area from development. She donated a portion of the land to the Audubon Society's nature center in the hopes of creating a children's farm. In 1978, the center and farm were combined into a single organization, the Aullwood Audubon Center and Farm. Since 1978, Aullwood has continued to grow and develop. The most recent developments have been the construction of a new education wing and the new Charity A. Krueger Farm Discovery Center. The education wing was added onto the existing nature center in 2000, in celebration of Marie Aull's 103rd birthday and the farm center was built in 2012 with the addition of solar panels in 2015. Both the center and the farm work to promote environmental education and sustainable agriculture. They provide activities that increase understanding and preservation of the planet by children and adults through education, research and recreation.

Environmental Education

The Nature Center, Farm Discovery Center, and Nature Sanctuary all work together to provide guests of Aullwood with deeper understanding and connection to the environment. Visiting the Nature Center, guests are able to explore interactive displays in the Room of Discovery and Hall of Wonder to learn more about the animals at Aullwood as well as the native plants growing throughout the area. There are also events hosted throughout the year where staff and local experts present information on a variety of environmental topics. The education staff also hosts Dayton area schools for sessions about natural science to connect their classroom learning with experience in nature. Additionally, the Farm Discovery Center also houses the country's only farm-based preschool!

Sustainable Agriculture

Aullwood Farm works to be a model for sustainable agriculture. Their primary crops are grass and forage crops, which they raise using ECO farming. ECO farming stands for eternal no till, continuous living cover crops, and other best practices. All of these aspects work to improve soil health, maintain good bacteria growth, and keep soil temperatures down. Aullwood also has grass-raised beef, naturally raised chickens, pork, and turkey. The meat raised at Aullwood is processed by local butchers and can be bought at the farm store. The Farm Discovery Center is also LEED (Leadership in Energy and Environmental Design) Gold Certified bringing sustainability to the farm itself as well as the practices.



Heating and Cooling

Geothermal Heating and Cooling

The earth beneath our feet maintains more consistent temperature than the air outside. This means that the earth is relatively cooler than the air in the summer and relatively warmer in the winter. Geothermal heating and cooling takes advantage of this consistency by using the warmer earth rather than the cold outdoor air to heat buildings in the winter and vice versa in the summer. This process allows greater efficiencies in ground source heating when compared to air source heating. Aullwood currently uses air source heating and cooling which does not have enough capacity and is costly in peak heating and cooling months. By transitioning to ground source, Aullwood can create a more comfortable atmosphere while saving energy in the process.



Building Envelope

No matter how efficient a building's heating and cooling system is, if the building isn't insulated, money is going out the windows, doors, floors, and ceilings. Air naturally wants to flow from warm areas to cold areas. Good insulation prevents this flow and reduces the amount of air that has to be heated/cooled. This keeps buildings at the desired temperature without the systems having to constantly run. At Aullwood, measures have been taken to improve the building envelope, sealing doorways and windows. However, the aging roof needs to be redone with improved insulation to cut down on permeation.

Heating and Cooling Controls

Another big opportunity for energy savings in heating and cooling comes from scheduling the systems on and off times. By turning thermostats back during times where there are no occupants, building owners can save as much as 10% on heating and cooling (energy.gov). Aullwood has installed programmable, Wi-Fi capable thermostats throughout the Nature Center. However, the current system is not equipped to effectively handle the temperature setbacks.

Lighting and Solar

LED Lighting

Light-emitting diodes (LEDs) are one of the best ways for organizations to save money and energy in their facilities. LEDs use at least 75% less energy and last 25 times longer than incandescent lighting (energy.gov). Aullwood has been transitioning from incandescent lightbulbs to LEDs for the past few years. New developments in LED technology will allow Aullwood to implement LED lighting in the rest of the facility for a quick return on investment.

Solar Generation

The Farm Discovery Center has a photovoltaic (PV) system which has generated over 20,000 kWh of energy since it was installed in 2012. Additional solar panels can be added to the Farm Discover Center as well as the development of a new system at the Nature Center to increase the amount of renewable energy used at Aullwood.

Education

Aullwood's mission is first and foremost about education. Thus, whatever steps are being taken towards increased sustainability in the facilities should be shared with visitors. Through this project a unified platform for building sustainability and energy literacy is being developed so visitors can learn about more sustainable practices and the impacts their energy choices have on the environment. Aullwood is also creating online content so people can learn more about their advancements in sustainability even if they aren't at Aullwood itself.

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